

a first birefringent plate, wherein the first birefringent plate separates the at least one signal light ray into a plurality of sub-signal rays,

a second birefringent plate optically coupled to the first birefringent plate;

at least one optical rotator optically coupled between the first and second birefringent plates, wherein the at least one optical rotator intercepts a portion of the plurality of sub-signal rays,

at least one reciprocal optical rotator and at least one non-reciprocal optical rotator optically coupled to the second birefringent plate at a side opposite to the at least one optical rotator, and

a lens optically coupled to the at least one reciprocal rotator and the at least one non-reciprocal optical rotator at a side opposite to the second birefringent plate; and

a mirror optically coupled to the at least one birefringent plate, wherein the mirror and the at least one birefringent plate causes the at least one signal light ray to be folded back upon itself, wherein the at least one signal light ray is directed to a second port.

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29. (New) A reflection-type optical circulator, comprising:

at least one birefringent plate for receiving at least one signal light ray from a first port;

a mirror optically coupled to the at least one birefringent plate, wherein the mirror and the at least one birefringent plate causes the at least one signal light ray to be folded back upon itself, wherein the at least one signal light ray is directed to a second port;

an optical rotator optically coupled to the at least one birefringent plate, wherein the at least one birefringent plate separates the at least one signal light ray into a plurality of sub-signal rays, wherein the optical rotator intercepts a portion of the plurality of sub-signal rays;

a beam-turning reflector optically coupled to the at least one birefringent plate and to the

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optical rotator at a side opposite to the at least one birefringent plate;

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a polarization beam-splitter optically coupled to the at least one birefringent plate, the optical rotator at a side opposite to the at least one birefringent plate, and the beam-turning reflector at a side perpendicular to the optical rotator;

at least one reciprocal optical rotator and at least one non-reciprocal optical rotator optically coupled to the polarization beam-splitter at a side opposite to the optical rotator; and

a lens optically coupled to the at least one reciprocal optical rotator and the at least one non-reciprocal optical rotator at a side opposite to the polarization beam-splitter.

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40. (New) A system for directing a signal light ray, comprising:

an optical network, the optical network comprising the signal light ray; and

a reflection-type optical circulator comprising a plurality of ports, wherein the signal light ray is received at one of the plurality of ports, the reflection-type optical circulator further comprising:

at least one birefringent plate, wherein the at least one birefringent plate comprises:

a first birefringent plate, wherein the first birefringent plate separates the at least one signal light ray into a plurality of sub-signal rays, and

a second birefringent plate optically coupled to the first birefringent plate,

a mirror optically coupled to the at least one birefringent plate, wherein the mirror and the at least one birefringent plate causes the signal light ray to be folded back upon itself, wherein the signal light ray is directed to another of the plurality of ports,

at least one optical rotator optically coupled between the first and second birefringent plates, wherein the at least one optical rotator intercepts a portion of the plurality of

sub-signal rays,

at least one reciprocal optical rotator and at least one non-reciprocal optical rotator optically coupled to the second birefringent plate at a side opposite to the at least one optical rotator, and

a lens optically coupled to the at least one reciprocal optical rotator and the at least one non-reciprocal optical rotator at a side opposite to the second birefringent plate.

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(New) A system for directing a signal light ray, comprising:

an optical network, the optical network comprising the signal light ray; and

a reflection-type optical circulator comprising a plurality of ports, wherein the signal light ray is received at one of the plurality of ports, the reflection-type optical circulator further comprising:

at least one birefringent plate,

a mirror optically coupled to the at least one birefringent plate, wherein the mirror and the at least one birefringent plate causes the signal light ray to be folded back upon itself, wherein the signal light ray is directed to another of the plurality of ports,

an optical rotator optically coupled to the at least one birefringent plate, wherein the at least one birefringent plate separates the signal light ray into a plurality of sub-signal rays, wherein the optical rotator intercepts a portion of the plurality of sub-signal rays,

a beam-turning reflector optically coupled to the at least one birefringent plate and to the optical rotator at a side opposite to the at least one birefringent plate;

a polarization beam-splitter optically coupled to the at least one birefringent plate and to the optical rotator at a side opposite to the at least one birefringent plate and to the beam-turning reflector at a side perpendicular to the optical rotator,